

WHAT IS CLAIMED IS:

1. A fixed material transportation apparatus comprising:

a sucking unit including a fixed material transportation surface on which a plurality of sucking holes are formed, a
5 decompression chamber communicating with the sucking holes and a sucking device for sucking air in the decompression chamber;

a delivering device for adsorbing a fixed material supplied onto the fixed material transportation surface of the sucking unit onto the fixed material transportation surface
10 through the sucking hole by the sucking device, and delivering the fixed material from an upstream side of the sucking unit to a downstream side thereof,

wherein each of the sucking holes of the sucking unit is formed by a through hole section communicating with the
15 decompression chamber and a sucking chamber having a larger area of a sucking surface opposed to the fixed material than a sectional area of the through hole section.

2. The fixed material transportation apparatus according

20 to claim 1, wherein each of the sucking chambers includes a concave portion formed onto the fixed material transportation surface and the sucking chambers are mutually partitioned by partition walls.

25 3. The fixed material transportation apparatus according

to claim 2, wherein the concave portion is partitioned and formed by the partition walls in a main scanning direction and a subscanning direction of the transportation apparatus.

5 4. The fixed material transportation apparatus according to claim 2, wherein each of the sucking chambers has a sucking surface formed by an almost rectangular concave portion.

5. The fixed material transportation apparatus according
10 to claim 1, wherein each of the sucking chambers has a sucking surface formed by an almost circular concave portion.

6. The fixed material transportation apparatus according
to claim 4, wherein a width of a top of the partition walls
15 is smaller than a dimension of one side or a diameter of the sucking surface of the sucking chamber.

7. The fixed material transportation apparatus according
to claim 4, wherein a top of the partition walls is formed linearly
20 with an area of approximately zero.

8. The fixed material transportation apparatus according
to claim 4, wherein a top of the partition walls in at least
the main scanning direction is formed linearly with an area
25 of approximately zero.

9. A liquid fixing apparatus comprising the fixed material transportation apparatus according to any of claims 1 to 8.

5 10. A sucking unit comprising:

a sucking and holding section provided with a plurality of sucking holes;

a decompression chamber formed integrally with the sucking and holding section and communicating with the sucking

10 holes, and

a sucking device for sucking air in the decompression chamber,

wherein a fixed material supplied onto the sucking and

holding section is adsorbed onto the sucking and holding section

15 by the sucking device through the sucking holes,

wherein each of the sucking holes is formed by a through hole section communicating with the decompression chamber and a sucking chamber in which an area of a sucking surface opposed to the fixed material is larger than a sectional area of the

20 through hole section.

11. A fixed material transportation apparatus for adsorbing and delivering a fixed material supplied onto the fixed material transportation surface,

25 wherein the fixed material transportation surface is

provided with a dimple capable of absorbing an improper state by a wrinkle generated in the fixed material.

12. The fixed material transportation apparatus according
5 to claim 11, wherein the dimple is formed corresponding to an extension rate of the fixed material.

13. The fixed material transportation apparatus according to claim 11, wherein the dimple is formed corresponding to a
10 shape of a wrinkle generated on the fixed material.

14. The fixed material transportation apparatus according to claim 11, wherein a regulating device for regulating a shape
of a wrinkle generated on the fixed material is provided on
15 an upstream side of transportation from the fixed material transportation surface.

15. The fixed material transportation apparatus according to claim 14, wherein the regulating device is provided in a
20 position corresponding to the dimple.

16. The fixed material transportation apparatus according to claim 11, further comprising: a sucking unit including
a plurality of sucking holes provided on the fixed material
25 transportation surface,

a decompression chamber communicating with the sucking holes, the sucking holes communicating with the decompression chamber and

5 a sucking device for sucking air in the decompression chamber,

wherein each of the sucking holes includes a sucking chamber having a larger area of a sucking surface opposed to the fixed material than a sectional area of the sucking hole, so that the sucking chamber functions as the dimple.

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17. A liquid fixing apparatus comprising the fixed material transportation apparatus according to any of claims 11 to 16.

18. A fixed material transportation apparatus for adsorbing

15. and delivering a fixed material supplied onto a fixed material transportation surface,

wherein the fixed material transportation surface is provided with a dimple having a depth changed in a transportation direction of the fixed material.

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19. The fixed material transportation apparatus according to claim 18, further comprising:

 a sucking unit including a plurality of sucking holes provided on the fixed material transportation surface,

25 a decompression chamber communicating with the sucking

holes and the sucking holes communicating with the decompression chamber, and

a sucking device for sucking air in the decompression chamber,

5 wherein each of the sucking holes includes a sucking chamber having a larger area of a sucking surface opposed to the fixed material than a sectional area of the sucking hole, so that the sucking chamber functions as the dimple.

10 20. The fixed material transportation apparatus according to claim 19, wherein the sucking chamber is formed such that a depth is gradually increased from an edge on an upstream side in a transportation direction of the fixed material to the sucking hole.

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21. A liquid fixing apparatus comprising the fixed material transportation apparatus according to any of claims 18 to 20.

20 22. A fixed material transportation apparatus comprising a sucking unit for sucking and holding a fixed material and a delivering device for delivering the fixed material from an upstream side of the sucking unit to a downstream side thereof, the sucking unit having a fixed material transportation surface provided with a plurality of sucking holes, a
25 decompression chamber communicating with the sucking holes and

a sucking device for sucking air in the decompression chamber,

the fixed material supplied onto the fixed material transportation surface of the sucking unit being adsorbed onto the fixed material transportation surface through the sucking

5 hole by the sucking device during fixing a liquid by the delivering device and being delivered from an upstream side to a downstream side,

..... wherein a hard porous material is provided in a position corresponding to a fixed material edge section of the fixed
10 material transportation surface.

23. The fixed material transportation apparatus according to claim 22, wherein a hard porous material is provided in positions corresponding to widths of various papers of the fixed
15 material.

24. The fixed material transportation apparatus according to claim 22, wherein the hard porous material is provided to be extended in a lateral direction of the fixed material.

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25. The fixed material transportation apparatus according to claim 22, wherein the hard porous material is removably attached to the fixed material transportation surface.

25 26. The fixed material transportation apparatus according

to claim 22, wherein an absorbing material is provided on an underside of the hard porous material.

27. The fixed material transportation apparatus according
5 to claim 22, wherein a lower part of the hard porous material
communicates with a decompression chamber.

28. A liquid fixing apparatus comprising the fixed material
transportation apparatus according to any of claims 22 to 27.

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29. A fixed material transportation apparatus comprising:
a fixed material transportation surface on which a fixed
material is sucked and transported,
wherein a chamfer is provided in at least one of an air
15 inlet portion and an air outlet portion in a sucking hole formed
on the fixed material transportation surface.

30. The fixed material transportation apparatus according
to claim 29, wherein a chamfered surface of the air inlet portion
20 of the sucking hole is a rounded surface.

31. The fixed material transportation apparatus according
to claim 30, wherein a radius of the rounded surface ranges
from 0.2 mm to 1 mm.

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32. The fixed material transportation apparatus according to claim 29, wherein a chamfered surface of the air outlet portion of the sucking hole is a taper surface.

5 33. The fixed material transportation apparatus according to claim 32, wherein a taper of the taper surface has an opening angle ranging from 60 degrees to 90 degrees and an axial length ranging from 1 mm to 2 mm.

10 34. A liquid fixing apparatus comprising the fixed material transportation apparatus according to claim 29.